and a Ctenophore (pl. iii. fig. 25) with its lateral tubes on the sides of the digestive cavity (*g*), leading into the chymiferous pouches (*w*), branching into the chymiferous tube. The cœliac openings (pl. iii. fig. 45, *ca*) of the funnel he looks upon as representing the madreporic body, while I look upon them as the anal openings. In this view of the case, the Ctenophore is rather more in the embryonic condition of the Echinoderm larva, when the actinostome leading into the digestive cavity should perform at the same time the function of mouth and anus, which it occasionally does, although at other times the cœliac opening of the funnel seems to be the true anal opening, while, according to Metschnikoff, it is the madreporic body which performs the part of an anal opening. He says it only acts to introduce water into the system, which is contrary to my observations.

I may here recall former statements* concerning the affinities of the Ctenophora, when describing some of the younger stages. It could only be after a careful comparison of Ctenophorous and Echinoderm embryos that undoubted evidence of their identity of plan might be obtained. The Ctenophora retain the permanently embryonic features of Echinoderm embryos, in which the water-system is still connected with the digestive cavity. The formation of a funnel as a sort of alimentary canal, opening externally through the cœliac apertures at the abactinal pole, corresponds to the existence of a short alimentary canal in Echinoderm larvæ. The Ctenophora are, from their embryology, more closely related to the Echinoderms than to the other Acalephs; and it seems natural to separate the Acalephs into two orders—the Ctenophora, characterized by the presence of locomotive flappers, and the Medusidæ, including the Discophora and Hydroids.—*From the Memoirs of the American Academy of Arts and Sciences*, vol. x. no. iii., August 1874.

*Notice of Papers on Embryology by A. Kowalevsky.* By A. Agassiz.

A. Kowalevsky has published, unfortunately in Russian, two capital papers on embryology. The one continues the investigations he had been carrying on regarding the existence of an ectoderm and entoderm layer in the early embryonic stages of Invertebrates. In the present paper he has given a summary of the early stages of a *Campanularia*, confirming the observations of Wright and A. Agassiz. For *Rhizostoma* and *Cassiopea* he shows that the digestive cavity is formed by the invagination of the ectoderm. This is contrary to the results of previous observers, except Schneider. For *Pelagia* he shows a direct development from the egg remarkably similar to that of the Geryonidæ as we know it from Häckel, Fol, and Metschnikoff. He adds nothing to the embryology of Actinia not already known from the magnificent monograph of Lacaze-Duthiers. He then passes on to the development of *Alcyonium*, of which he gives an extremely interesting sketch supplemented by fragments on the embryology of *Astræa*, *Gorgonia*, and *Cerianthus*: the development of the latter is strikingly similar to that of *Edwardsia*, as we know it during its passage from *Arachnactis* to *Edwardsia*. He

* Alexander Agassiz, Ill. Cat. M. C. Z. no. 2, p. 12, 1865.

has added a few observations on the earlier embryonic stages of *Eschscholtzia*, *Beroë*, and *Eucharis*, completing deficiencies in his earlier papers on the embryology of Ctenophora. These supplementary observations agree completely with the observations of A. Agassiz on the embryology of Ctenophora.

The second memoir is a very complete history of the development of Brachiopods, strikingly in accordance with the views of Steenstrup and of Morse on the affinities of Brachiopods with Annelids. The homology between the early embryonic stages of *Argiope* and well-known Annelid larvæ is most remarkable; and the resemblance between some of the stages of *Argiope* figured by Kowalevsky and the corresponding stages of growth of the so-called Lovén type of development among Annelids is complete. The number of segments is less; but otherwise the main structural features show a closeness of agreement which will make it difficult for conchologists hereafter to claim Brachiopods as their special property. The identity in the ulterior mode of growth between the embryo of *Argiope* and of *Balanoglossus* in the *Tornaria*-stage is still more striking: we can follow the changes undergone by *Argiope* while it passes through its *Tornaria*-stage (if we may so call it) and becomes gradually, by a mere modification of the topography of its organs, transformed into a minute pedunculated Brachiopod differing as far from the *Tornaria*-stage of *Argiope* as the young *Balanoglossus* differs from the free-swimming *Tornaria*. In fact, the whole development of *Argiope* is a remarkable combination of the Lovén and of the *Tornaria* types of development among Worms. His paper also includes the history of a less vermiform type of development, that of *Thecidium* and of *Terebratula*, in which the observations of Kowalevsky fully agree with the previous well-known memoir of Lacaze-Duthiers on *Thecidium*, and of Morse on *Terebratulina*. It is not out of place to recall the very ungenerous treatment which Morse received at the hands of many conchologists for the heresies of his papers on the systematic position of Brachiopoda; and it certainly is a striking proof of the sagacity of Morse, to have announced so positively, from the history of the American Brachiopods alone, the vermiform affinities of Brachiopods, now so conclusively proved by the development of *Argiope* in Kowalevsky's paper.

The close relationship between Brachiopods and Bryozoa cannot be more fully demonstrated than by the beautiful drawings on pl. v. of Kowalevsky's history of *Thecidium*. We shall now have at least a rational explanation of the homologies of Brachiopods, and the transition from such types as *Pedicellina* to *Membranipora* and other incrusting Bryozoa is readily explained from the embryology of *Thecidium*. In fact, all incrusting Bryozoa are only communities of Brachiopods the valves of which are continuous and soldered together, the flat valve forming a united floor, while the convex valve does not cover the ventral valve, but leaves an opening more or less ornamented for the extension of the lophophore*. —*Silliman's American Journal*, Dec. 1874.

* Mr. B. P. Mann translated for me the explanation of the plates of the two memoirs of Kowalevsky.